S/N Unknown **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kie Y. Ahn et al.	Examiner: Unknown
Serial No.:	Unknown	Group Art Unit: Unknown
Filed:	Herewith	Docket: 303.377US3
Title:	POROUS SILICON OXYCARBIDE INTEGRATED CIRCUIT INSULATOR	

PRELIMINARY AMENDMENT

BOX PATENT APPLICATION
Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to taking up the above-identified patent application for review, please amend the application as follows:

IN THE SPECIFICATION

On page 1, line 5, before the heading, "Technical Field of the Invention", insert the following paragraph:

Cross Reference to Related Applications

This application is a continuation of U.S. Patent Application No. 08/950,319, filed on October 14, 1997, the specification of which is incorporated herein by reference.

IN THE CLAIMS

Please cancel claims 1 - 48 without prejudice or disclaimer.

Please add new claims 49 - 80.

49. A method, comprising:

forming a plurality of circuit elements on a substrate;

coating at least a portion of a surface of the substrate and at least one of the plurality of circuit elements with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms and which has a dielectric constant less than approximately 2.0.

50. The method of claim 49, wherein the mixture of oxide and carbon sources are selected from the group consisting of polymeric precursors, alkoxysilane, silicon alkoxide, methyldimethoxysilane (MDMS), and tetraethoxysilane (TEOS).

51. The method of claim 49, wherein transforming the mixture of oxide and carbon sources includes removing an excess portion of the silicon oxycarbide by chemical mechanical polishing (CMP) to obtain a desired thickness of the silicon oxycarbide.

52. The method of claim 49, wherein transforming includes hydrolyzing the mixture in the presence of an acid.

53. The method of claim 49, wherein transforming includes pyrolyzing the mixture.

54. A method, comprising:

providing a plurality of circuit elements on a substrate;

coating at least a portion of a surface of the substrate with a mixture of oxide and carbon sources;

transforming the mixture of oxide and carbon sources into a first porous oxycarbide glass dielectric layer on the integrated circuit and insulating first and second of the plurality of circuit elements from each other, the first porous oxycarbide glass dielectric layer having uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms;

selectively forming vias in the first porous oxycarbide glass dielectric layer for providing connection to the first and second circuit elements;

forming metal layers in the vias and elsewhere on a working surface of the substrate;

patterning and etching the metal layers to provide desired interconnection between the first and second circuit elements and other circuit elements or interconnection lines;

coating at least a portion of a surface of a substrate with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a second porous oxycarbide glass dielectric layer on the integrated circuit.

55. The method of claim 54, wherein the second porous oxycarbide glass dielectric layer has a dielectric constant less than approximately 2.0.

56. The method of claim 55, wherein the second porous oxycarbide glass dielectric layer has uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms.

57. The method of claim 54, wherein the second porous oxycarbide glass dielectric layer has uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms.

58. The method of claim 54, wherein the first porous oxycarbide glass dielectric layer has a dielectric constant less than approximately 2.0.

59. A method, comprising:

forming a plurality of circuit elements on a substrate;

coating at least a portion of a surface of the substrate and at least one of the plurality of circuit elements with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms.

60. The method of claim 59 wherein the mixture of oxide and carbon sources are selected from the group consisting of polymeric precursors, alkoxysilane, silicon alkoxide, methyldimethoxysilane (MDMS), and tetraethoxysilane (TEOS).

61. The method of claim 59, wherein transforming the mixture of oxide and carbon sources includes removing an excess portion of the silicon oxycarbide by chemical mechanical polishing (CMP) to obtain a desired thickness of the silicon oxycarbide.

62. The method of claim 59, wherein transforming includes hydrolyzing the mixture in the presence of an acid.

63. The method of claim 59, wherein transforming includes pyrolyzing the mixture.

64. A method, comprising:

forming a plurality of circuit elements on a substrate;

coating at least a portion of a surface of the substrate and at least one of the plurality of circuit elements with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter of 30 angstroms.

65. The method of claim 64, wherein the mixture of oxide and carbon sources are selected from the group consisting of polymeric precursors, alkoxysilane, silicon alkoxide, methyldimethoxysilane (MDMS), and tetraethoxysilane (TEOS).

66. The method of claim 64, wherein transforming the mixture of oxide and carbon sources includes removing an excess portion of the silicon oxycarbide by chemical mechanical polishing (CMP) to obtain a desired thickness of the silicon oxycarbide.

67. The method of claim 64, wherein transforming includes hydrolyzing the mixture in the presence of an acid.

68. The method of claim 64, wherein transforming includes pyrolyzing the mixture.

69. A method, comprising:

forming a plurality of circuit elements on a substrate;

coating at least a portion of a surface of the substrate and at least one of the plurality of circuit elements with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having

uniformly distributed voids that have an approximate diameter of 200 angstroms.

70. The method of claim 69, wherein the mixture of oxide and carbon sources are selected from the group consisting of polymeric precursors, alkoxysilane, silicon alkoxide, methyldimethoxysilane (MDMS), and tetraethoxysilane (TEOS).

71. The method of claim 69, wherein transforming the mixture of oxide and carbon sources includes removing an excess portion of the silicon oxycarbide by chemical mechanical polishing (CMP) to obtain a desired thickness of the silicon oxycarbide.

72. The method of claim 69, wherein transforming includes hydrolyzing the mixture in the presence of an acid.

73. The method of claim 69, wherein transforming includes pyrolyzing the mixture.

74. A method of forming a silicon oxycarbide layer having uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms on a substrate, comprising:

coating at least a portion the substrate with a mixture of oxide and carbon; and

transforming the mixture of oxide and carbon sources into the silicon oxycarbide layer.

75. The method of claim 74, wherein coating at least a portion of the substrate includes coating at least one circuit element on the substrate.

76. The method of claim 74, wherein coating at least a portion of the substrate includes coating a plurality of circuit elements on the substrate.

77. A method, comprising:

coating at least a portion of a surface of the substrate with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms and which has a dielectric constant less than approximately 2.0.

78. A method, comprising:

coating at least a portion of a surface of the substrate with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter between 20 angstroms and 300 angstroms.

79. A method, comprising:

coating at least a portion of a surface of the substrate with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter of 30 angstroms.

80. A method, comprising:

coating at least a portion of a surface of the substrate with a mixture of oxide and carbon sources; and

transforming the mixture of oxide and carbon sources into a silicon oxycarbide having uniformly distributed voids that have an approximate diameter of 200 angstroms.

COMMENTS

Claims 1 - 48 are canceled without prejudice or disclaimer. New claims 49 - 80 are added. Claims 49 - 80 are now pending.

The specification is amended to add a cross reference to the prior application. No new matter is added by way of these amendments.

The application filing fee as calculated on the application transmittal sheet reflects the amendments to the claims described above.

The Applicant respectfully requests that the preliminary amendment described herein be entered into the record prior to examination and consideration of the above-identified application.

Respectfully submitted,

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